

Case Report on Surgery-First Approach

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Abstract

The Rationale: The surgery-first approach provides immediate improvement in facial aesthetics in orthognathic cases with a shorter total treatment period. **Patient Concerns:** A 21-year-old male came with the chief complaint of protrusive lower front teeth and a large lower jaw. His main concern was aesthetics. **Diagnosis:** This was a case of skeletal Class III malocclusion with reverse overjet of 4 mm, overbite of 6 mm with a concave profile, and a protrusive chin. **Treatment:** The patient was treated by bilateral sagittal split setback osteotomy of the mandible with surgery first approach via nonextraction therapy. **Outcome:** After an active treatment of 15 months, improved facial profile, facial proportions, and a significant reduction of mandibular prognathism were much appreciated. The treatment results were stable after a 1-year follow-up of the treatment. **Take-away Lesson:** This case report highlights the utilization of nature's dental decompensation to achieve a desirable result, thereby attaining "more with less."

Keywords: Presurgical orthodontics, skeletal Class III, surgery first

INTRODUCTION

In conventional orthognathic surgery, the presurgical orthodontic phase often worsens the profile and reduces the patient's cooperation during treatment.^[1,2] However, in surgery-first approach (SFA), there is an immediate improvement in facial appearance, improving the patient's cooperation. Postoperative orthodontic alignment is achieved easier and faster due to the increased osteoclastic activities and metabolic changes in the dentoalveolar region caused by orthognathic surgery with shortened treatment time to 1–1.5 years.^[2-5] This article illustrates a skeletal Class III treatment via "surgery-first" using nature's compensation to achieve the desired results.

CASE REPORT

Patient concerns

A 21-year-old male presented to the department with the chief complaint of protrusive lower front teeth and a large lower jaw. His medical and dental history was nonsignificant. The patient was apprehensive regarding aesthetics and had low self-esteem. After the completion of the treatment, informed consent was obtained from the patient for publication of the case.

Extraoral examination revealed a concave profile, positive lip step, and a large mandible with a protrusive chin [Figure 1]. Intraorally,

there was a Class III molar and canine relation, mild crowding of upper anterior teeth, and reverse overjet of 4 mm and overbite of 6 mm [Figure 1]. The patient's face was grossly symmetrical.

Diagnostic aids

Cephalometric examination revealed a normal maxilla and prognathic mandible, proclined upper incisors, retroclined lower incisors, and a horizontal growth pattern. The cranial base with SN (Sella-Nasion): Maxilla length: Mandibular length proportions were 20:13.8:24.9 (ideal-20:14:21). Orthopantomogram showed no abnormality of the temporomandibular joint [Figure 2].

Treatment

Treatment objectives

- The primary objective of treatment was to address the patient's chief complaint, i.e. forwardly placed lower jaw

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Figure 1: Pretreatment intra- and extraoral photographs

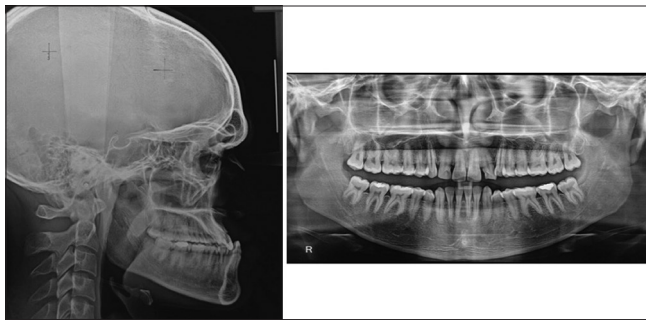


Figure 2: Pretreatment radiographs

- To attain Class I canine and molar relation with ideal overjet and overbite
- To obtain a balanced profile and establish good functional occlusion

Treatment alternative

Camouflage treatment was not opted because upper incisors were already proclined; it will not improve the patient's profile. Orthognathic surgical treatment was explained to the patient. As the patient was overly concerned about his appearance, SFA was planned. The clinical presentation and radiographic evaluation showed that the Class III deformity was primarily due to a prognathic mandible, so a bilateral sagittal split osteotomy (BSSO) for mandibular setback followed by fixed orthodontic treatment was planned.

Treatment progress

Banding and bonding of premolars and molars were done with MBT 0.022 "x 0.028" one day before surgery. A facebow transfer recorded the relationship of the maxilla to the transverse horizontal hinge axis of the mandible. A splint was fabricated with Class I canine and molar relation after performing mock surgery. Under general anesthesia, bilateral sagittal split osteotomy was performed [Figure 3]. A rigid fixation was done with miniplates, screws, and intermaxillary fixation was done for 2 weeks. After 2 weeks, alignment and leveling of upper and lower arches were started. Incisor

bonding was done, and 0.014" NiTi archwire was placed in the upper and lower arches. Subsequently, the wires were changed to finish in 0.019" x 0.025" stainless steel archwire, followed by postsurgical finishing and detailing. After debonding, maxillary Hawley's retainer and lower bonded retainer were given for retention purpose.

Outcomes

The posttreatment photographic images revealed an improvement in the patient's profile that can be appreciated along with a reduction in the lower lip protrusion [Figure 4]. Comparison of cephalometric values showed improvement in facial profile, improved facial proportions, and a substantial reduction in mandibular prognathism [Figure 5 and Table 1]. Class I molar and canine relation was achieved with ideal overjet and overbite [Figure 4]. The overall treatment duration was dramatically reduced to 15 months.

The upper incisors were proclined, and the lower incisors were retroclined to the skeletal base. Even though the posttreatment extraoral results were promising, cephalometrically, the SNB (87°) and ANB (-5°) were still not ideal, but the soft tissue results were appreciable. The complications of bi-jaw surgery were avoided while providing an optimum aesthetic outcome.

Follow-up

The case was followed up for 1-year posttreatment with stable results. The patient was very satisfied with the results. Significant improvement in his confidence and self-esteem was also noted.

DISCUSSION

In the SFA, orthognathic surgery precedes the presurgical orthodontic phase followed by the postoperative orthodontic corrections. The advantages of SFA include improvement in patient's profile and dental function early in treatment, improvement in patient's swallowing and speech after surgery,^[6] and the proceeding of orthodontic tooth movement at a much faster pace after surgery,^[4,5,7] thus reducing the

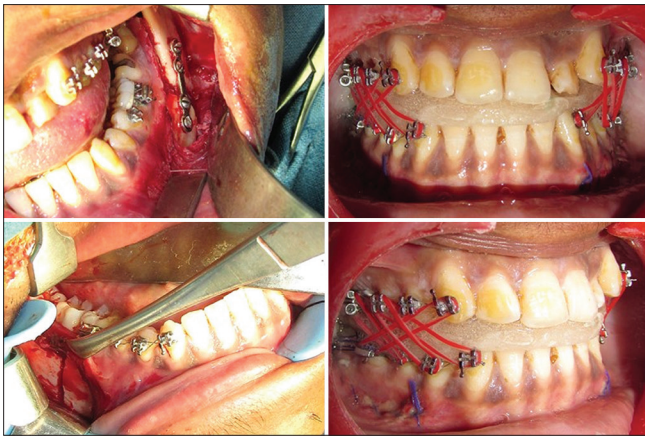


Figure 3: Surgical procedure



Figure 4: Posttreatment intra- and extraoral photographs

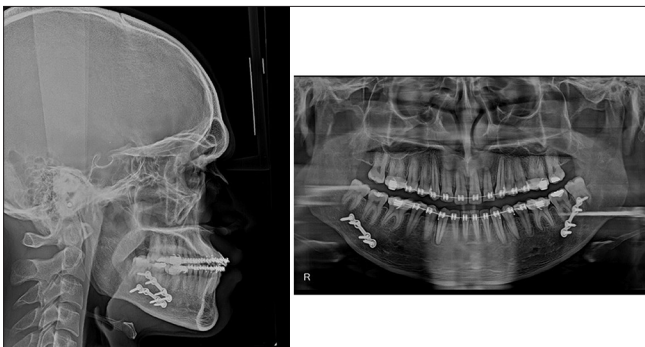


Figure 5: Posttreatment radiographs

overall treatment time and improved cooperation of the patient.^[8] According to Behrman and Behrman, corrected jaw position normalises the surrounding soft tissues; lips, cheeks, and tongue, facilitating postoperative tooth movement and reduction in the treatment time.^[9]

SFA is favorable in cases where the arches are almost well aligned with flat-to-moderate Curve of Spee and normal to mildly proclined/retroclined incisors with minimal transverse discrepancies.^[3] Preoperative orthodontic treatment in a conventional orthodontics first approach can take up to 15–24 months resulting in longer active treatment time.^[7] SFA does not impair the final occlusion^[6] and can be performed in skeletal Class III patients and skeletal Class II deformities. It

Table 1: Cephalometric values

Parameters	Norms (°)	Preoperative (°)	Postoperative (°)
SNA	82	82	82
SNB	80	93	87
ANB	2	-11	-5
GoGn to SN	32	20	23
U1 to SN	102	117	115
IMPA	90	75	80

SN = Sella-Nasion; SNA = SN A point; SNB = SN B point; GoGn to SN = Gonion-Gnathion angle to SN; ANB = A point nasion B point; U1 to SN = Upper incisor to SN; IMPA = Incisor mandibular plane angle

is mainly indicated in skeletal Class III patients because of pronounced soft tissue imbalance in these patients.^[4]

Although the SFA has its inherent advantages, several difficulties and challenges still exist. Disadvantages of the technique include the need for predicting the outcome of postoperative orthodontic treatment accurately, especially when planned in two-dimensional plane,^[4] problems of occlusal instability after surgery which can cause skeletal instability,^[10] and increased surgical movement to compensate for the amount of dental decompensation.^[11]

In this case, because of the prognathic mandible, a severe skeletal Class III deformity was presented. The patient was highly concerned about his aesthetics, so SFA via BSSO with a mandibular setback of 6 mm was planned. The overall treatment time was 15 months, with no surgical complications. Class I molar and canine relation was attained with improved facial balance and the final occlusal relationships were good. One year follow-up showed stable results.

The case was not ideal for SFA as there is upper dental proclination and lower dental retroclination with a deep bite. No presurgical orthodontic phase was carried out. If decompensation had been performed, the skeletal results might have been slightly improved. However, SFA was selected as the patient was very concerned about the aesthetics and a decompensation period was nonencouraging for the patient.

CONCLUSION

SFA is an incredible therapeutic tool with higher patient acceptance for orthognathic surgery, shorter treatment time, and an immediate correction in the profile. However, careful patient selection, meticulous treatment planning, and good communication between the patient, orthodontist, and maxillofacial surgeon are the basic requirements for success with this treatment approach. The takeaway lesson from this case is to make use of nature's dental compensations and "to attain more with less," i.e., patients who have better stability, minor complication, and cost-effectiveness.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his

consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed

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Conflicts of interest

There are no conflicts of interest.

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